APPENDICES

Appendix A:

CALIFORNIA ENERGY COMMISSION
CURRENT AND FUTURE SITING CASES

	Project	Applicant	Size (MW)	Cap. Cost	Location	Filing Date 1/
1	High Desert (97-AFC-1)	Inland & Constellation	720	$350+ million	Victorville, San Bernardino Co.	Jun. 30, 1997
2	Sutter Power (97-AFC-2)	Calpine	500	$300 million	Yuba City area, Sutter County	Dec. 15, 1997
3	Pittsburg (98-AFC-1)	Enron	500	$300 million	Pittsburg, Contra Costa County	Jun. 15, 1998
4	La Paloma (98-AFC-2)	U.S. Generating Co.	1,043	$500 million	McKittrick, Kern County	Aug. 12, 1998
5	Delta Energy (98-AFC-3)	Calpine & Bechtel	880	$400+ million	Pittsburg, Contra Costa Co.	Dec. 18, 1998
6	Sunrise Cogen (98-AFC-4)	Texaco Global Gas & Pwr	320	$250 million	Fellows, Kern County	Dec. 21, 1998
7	Elk Hills (99-AFC-1)	Sempra & Oxy	500	$250 million	Elk Hills, Kern Co.	Feb. 24, 1999
8	Three Mountain (99-AFC-2)	Ogden Power Pacific	500	$300 million	Burney, Shasta Co.	March 3, 1999
9	Metcalf (99-AFC-3)	Calpine & Bechtel	600	$300 million	Santa Clara Co.	April 30,1999
10	Moss Land Repwr (99-AFC-4)	Duke Energy	1,206	$500 million	Moss Landing, Monterey Co	May 7, 1999
11	Morro Bay Repower 2/	Duke Energy	530	$250 million	Morro Bay, San Luis Obispo Co.	July 1999
12	Otay Mesa 2/	U.S. Generating Co.	1,050	$500 million	Otay Mesa, San Diego Co.	July 1999
13	Midway-Sunset 2/	ARCO Western Energy	500	$300 million	Kern Co.	July 1999
14	Combined Cycle 3/		500	$300 million	Imperial. Co.	July 1999
15	Antelope Valley 2/	AES	1000	$500 million	California City, Kern Co.	July 1999
16	Combined Cycle 3/		1000	$500 million	Los Angeles Co.	Aug. 1999
17	Combined Cycle 3/		1000	$500 million	Orange Co.	Aug. 1999
18	Newark 2/	Calpine & Bechtel	600	$300 million	Alameda Co.	Aug. 1999
19	Blythe Energy 2/	Summit Energy Group	400	$250 million	Blythe, Riverside Co.	Aug. 1999
20	South City 2/	AES	550	$300 million	So. San Francisco, San Mateo Co.	Aug. 1999
21	Long Beach 2/	Enron	500	$300 million	Long Beach, LA Co.	Aug. 1999
22	Suntaw 2/	Suntaw Cogen Partners I	800	$450 million	Vernon, LA Co.	Sep. 1999
23	Pastoria 2/	Tejon Ranch	960	$300 million	Kern County	Oct. 1999
24	Combined Cycle 3/		500?	$300 million?	San Bernardino Co.	Nov. 1999
25	Combined Cycle 3/		120	$75 million	San Bernardino Co.	Feb. 2000
26	Combined Cycle 3/		500?	$300 million?	Los Angeles Co.	Mar. 2000
27	Combined Cycle 3/		500?	$300 million?	San Bernardino Co.	May 2000
28	Combined Cycle 3/		500	$300 million	San Bernardino County	May 2000
29	Combined Cycle 3/		400	$250 million	Kern County	June 2000
30	Combined Cycle 3/		400	$250 million	Kern County	June 2000
32	Combined Cycle 3/		500	$300 million	Yuba County	Sept. 2000
31	Combined Cycle 3/		500	$300 million	S.F. Bay Area	Dec. 2000
33	Combined Cycle 3/		500	$300 million	S.F. Bay Area	Dec. 2000
34	Combined Cycle 3/		500	$300 million	San Diego County	June 2001
35	Combined Cycle 3/		1500	$700 million	San Diego County	Dec. 2001

Notes:
1/Staff's expected filing date.

2/Project has been publicly announced.
3/Project is not publicly disclosed; working with potential applicant.

Source: California Energy Commission Staff. Revised 5/12/99

Appendix B:

GUIDANCE ON THE PROCEDURE FOR MAKING A BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

1. OVERVIEW

Federal regulations found in Parts 51 and 52 of Title 40 Code of Federal Regulations (40 CFR Parts 51 and 52) specify that one of two levels of emission control will apply to a new, or modified, stationary source of criteria pollutants subject to major source permitting requirements. The control requirements are pollutant specific and depend on an area's attainment status for the ambient air quality standards; a district may have an attainment designation for some pollutants and a nonattainment designation for other pollutants. The more stringent federal requirement is termed "lowest achievable emission rate (LAER)" and is required when an area is nonattainment for a standard; the less stringent federal requirement is termed "best available control technology (BACT)" and is required when an area is in attainment, or has an "unclassified" designation, for a standard. However, local air pollution control and air quality management districts (districts) in California use the term, "best available control technology (BACT)" exclusively when referring to the emission control requirements of their New Source Review (NSR) permitting programs. With a few exceptions, the district definitions of BACT are based on the more stringent of the two federal emission control requirements.[1]

Unless otherwise indicated, the use of the term "best available control technology (BACT)" in this document will refer to the emission control requirements in California as defined in a district's NSR permitting program regulation, often referred to as "California BACT." With some variation, the districts' BACT definitions generally share the following elements/provisions:

- BACT is determined for a given "class or category of source;"
- BACT is generally specified as the most stringent emission level of these three alternative minimum requirements:
  - the most effective control achieved in practice,
  - the most stringent emission control contained in any approved State Implementation Plan (SIP),
  - any more stringent emission control technique found by the district to be both technologically feasible and cost effective; and

[1]In certain districts with attainment, or unclassified, designations for the ambient air quality standards, the BACT definition may be more similar to the less stringent federal requirement.

- BACT emission limits must not be less stringent than a New Source Performance Standard (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP) or any other applicable federal, State, or district requirement.

As part of the NSR process, the district must review an applicant's proposed BACT for the project's emission sources. The BACT determination must be consistent with the district's BACT definition and is a demonstration that the emission source will be constructed, or modified, in such a manner that its operation will release the least amount of air pollutants possible. District permitting programs and the California Energy Commission power plant siting process provide opportunity for the Air Resources Board (ARB), United States Environmental Protection Agency (U.S. EPA), and public interest groups to provide input in the BACT decision process.

Following is a discussion of the generalized procedure for making a BACT determination.[2] A summary of a technical review of previous BACT determinations for power plant combustion turbines using natural gas is contained in Chapter III of ARB's "Guidance for Power Plant Siting and Best Available Control Technology." The technical review which is the basis for the Chapter III summary is contained in Appendix C. The technical review examines, in detail, the various control equipment and performance that have been achieved in practice or are technologically feasible.

B. DESCRIPTION OF A GENERALIZED PROCEDURE FOR DETERMINING BEST AVAILABLE CONTROL TECHNOLOGY

BACT determinations typically involve a methodical analysis of the applicable district's BACT definition, and past and recent BACT determinations. In this section, the generalized procedure is described for determining BACT. This generalized procedure reflects the common elements/provisions of district BACT definitions and consists of the following steps: 1) establishment of the "class or category of source," 2) determination of "achieved in practice levels," 3) evaluation of control measures and implementing rules and regulations contained in State Implementation Plans (SIPs), 4) identification of control technologies that are more

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[2]This procedure does not provide for the consideration of economic, energy, and environmental impacts; however, district BACT definitions based on the less stringent federal Best Available Control Technology definition found in **Section 169(3) of Part C of Title I of the federal Clean Air Act** provide for the consideration of economic, energy, and environmental impacts.

stringent than what has been "achieved in practice," and 5) the determination of BACT.

As the requirement for BACT is pollutant specific, the following generalized procedure should be repeated for each pollutant for which a proposed project's emissions will exceed BACT requirement thresholds. Also, when evaluating the information collected during each step of the generalized procedure, it may be necessary in some cases to reconsider the conclusions made at a previous step (i.e., one may need to repeat previous steps). For example, the "class or category of source" established in step one may be found to be overly broad, or narrow, after evaluation of information collected in latter steps.

Step 1. Establishing the "Class or Category of Source"

The effort to determine BACT begins with the establishment of the "class or category of source." The "class or category of source" establishes the scope of evaluations for the subsequent steps involving evaluations of control requirements. BACT determinations should be consistent within a "class or category of source."

"Class or category of source" provides the scope of what other basic equipment (or sources) will be used as comparables. The term "class or category of source" is not explicitly defined in federal, State, or district rules and regulations. As a practical matter, a power plant's basic equipment, processes, and energy sources (fuel) should be considered when establishing "class or category of source." Equipment or processes of similar type or function are typically placed together in a "class or category of source." Different makes (manufacturers) or models of the same type of basic equipment (e.g., a combustion turbine) generally should not be a consideration in establishing "class or category of source." However, the function and capacity of the basic equipment may be a consideration. It is noteworthy that the U.S. EPA has a technology transfer policy that broadens a "class or category of source" to include any sources with similar exhaust gas streams that could be controlled by the same or similar technology or any similar, but not necessarily identical, processes (e.g., similar coating operations).[3]

The establishment of an appropriate "class or category of source" is an important step; an appropriate selection will promote consistent BACT decisions that will help ensure that only the cleanest projects are approved. When the "class or category of source" that is otherwise applicable for a proposed project appears to be overly broad, the applicant has the burden of providing a demonstration to justify a narrower "class or category of source." For example, gas turbines may be considered a "class or category of source." Alternatively, one may want to

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[3] August 29, 1998, U.S. EPA Memorandum entitled, "Transfer of Technology in Determining Lowest Achievable Emission Rate (LAER)," from John Calcagni, Director of Air Quality Management Division, to David Kee, Director of Air and Radiation Division, Region V.

consider gas turbines fired on natural gas and gas turbines fired on oil as two different "classes or categories of source." Commonly, the "class or category of source" may have been restricted to account for differences in technological feasibility and performance of control equipment due to the size of the basic emitting equipment. In this case, the applicant would need to demonstrate to the district that there are changes in control efficiency, lack of demonstrated use, inability to obtain financing, or restrictive conditions of vendor guarantees or warranties, etc. that make the control technology infeasible. ARB staff does not consider lack of vendor guarantees or warranties alone to be sufficient justification for altering a "class or category of source" determination.

Step 2. Establishing the "Achieved In Practice" Emission Control Level

This step identifies what emission limitation or control technology is the most stringent control level that has been achieved in practice for a relevant "class or category of source." This step involves a review of past, and recent, performance of controls on other equipment units in the same "class or category of source." The emission levels achieved with the various controls are compared and ranked to determine which control is the most stringent. Emission concentrations, normalized emissions rates (e.g., lb per Btu) and/or technology-specific requirements should be used to compare the performance of the required controls. Averaging times for emission measurement may be a factor in comparing the emission levels.

There are several sources of information on past BACT determinations. BACT determinations are cataloged in the clearinghouses maintained by the California Air Pollution Officers Association (CAPCOA) and the U.S. EPA.[4] In California, several districts, including the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Unified Air Pollution Control District, have BACT guidance documents. However, the SCAQMD intends to discontinue use of its guidance document and begin maintaining its own clearinghouse.

Step 3. Rules Or Regulations Contained In Any Approved State Implementation Plan

[4]The CAPCOA and U. S. EPA RACT/BACT/LAER clearinghouses are available on the Internet at www.arb.ca.gov/bact/bact.htm and at mapsweb.rtpnc.epa.gov/RBLCWEB/b102.htm, respectively.

Typically, a BACT emission limitation must be at least as stringent as any control measure that is contained in any approved State Implementation Plan (SIP) that is applicable to the "class or category of source." For example, a district may have a rule specifically limiting emissions from stationary gas turbines, or more general rules restricting opacity or fuel sulfur content from any emission source required to obtain a permit. The BACT emission limitation should not be less stringent or cause a violation of any of these applicable SIP-approved rules and regulations. Therefore, this step involves evaluation of the rules and regulations of all California districts as well as the rules and regulations of other states that may apply to emission sources within the same "class or category of source." Rules and regulations for California districts are available from the ARB website. Rules and regulations for other states can be found at the U.S. EPA's RACT/BACT/LAER Clearinghouse website, individual state websites, or by contacting each state directly.[5]

Step 4. Control Technologies More Stringent Than Tho se Achieved In Practice

Most districts in California are required to consider more stringent control technologies than those that are achieved in practice. The more stringent controls must be both technologically feasible and cost effective. Where more than one such control exists, staff suggests that the U.S. EPA's "top-down," decision-making procedures be used to rank the controls.[6] Staff recommends that the district rank technologically feasible controls by stringency of emission control after making the following determinations or demonstrations:

- determine the technologies that are technologically achievable using data from prototype testing, utilization with another "class or category of source," or limited operation not meeting achieved in practice criteria;
- determine the economic feasibility of each of the technologies identified above with a cost-effectiveness analysis;
- determine if the cost effectiveness is within the cost effectiveness limits of current BACT requirements or predetermined cost-effectiveness criteria established by the district; and

[5]A listing of state air quality office contact information is available on the U.S. EPA website at www.epa.gov/ttn/uatw/saq_offices.htm.

[6]See previous footnote 3.

- rank the cost-effective control technologies from the most to least stringent.

Step 5. Making The BACT Decision

In the final step of the generalized procedure, a BACT decision is made. The BACT decision must be consistent with the provisions of the district's BACT definition including the requirement that the BACT emission limit must not be less stringent than an applicable NSPS or NESHAP. In most cases, the BACT decision will be based on the most stringent emission level of the following three alternative minimum requirements identified in earlier steps:

- the most effective control achieved in practice identified (See Step 2.),
- the most stringent emission control contained in any approved SIP (See Step 3.), or

- any more stringent emission control technique found by the district to be both technologically feasible and cost effective (See Step 4.).